VICTRIX ZEUS 20/27

Instruction Booklet

Eco-friendly wall-hung condensing boilers with stainless steel storage tank

Read these instructions completely before using or installing the Victrix Zeus 20/27 gas boilers

LEAVE THESE INSTRUCTIONS WITH THE USER

RVR Ltd.
Energy Technology

For Technical assistance, spare parts or service call:

RVR Limited, Kenmare, Co. Kerry Tel: 064 41344, Fax: 064 89520

Doc. Ref.: ALT112/171207

Introduction

The Victrix Zeus 20/27 boilers are condensing wall hung, room sealed combination boilers incorporating a 54 litre unvented hot water storage cylinder. This boiler has the highest efficiency possible for a gas boiler, ie 4 stars (****) in conformity with European Directive 92/42 EEC.

The boiler, providing both central heating and domestic hot water supply, is designed for use with a fully pumped, sealed and pressurised heating system using **Natural Gas or LPG**. The boiler is supplied for use with one of these gas types and must be converted before it can be used on another gas. A boiler equipped for natural gas must not be used on LPG or vice versa.

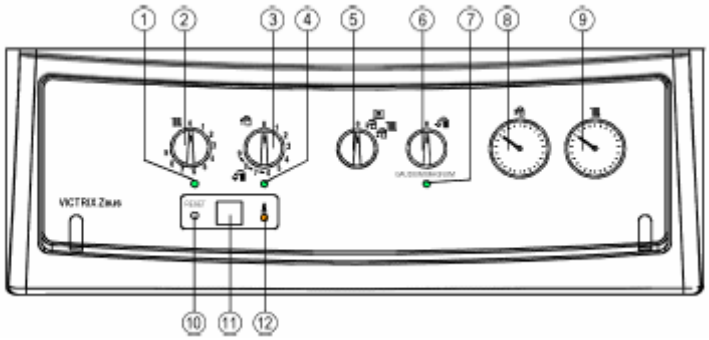
The boiler is supplied with a pump, diverter valve, automatic bypass, pressure relief valve, expansion vessel and pressure gauge fully assembled and tested.
As supplied, the boiler will automatically modulate to provide central heating outputs between 4.7 and 23.5kW (6.2 to 31.4kW for Victrix Zeus 27 model). The maximum output available for domestic hot water is 23.5 kW (31.4kW for Victrix Zeus 27 model) and provides hot water at temperatures of up to 60°C.

IMPORTANT

All gas appliances must be installed by a competent and qualified person, in accordance with relevant clauses of applicable standards and recommendations. These include but may not be limited to the the following:-
I.S. 813 Domestic Gas Installations
I.S, 820 Non-Domestic Gas Installations
All relevant Building Regulations.
Local Water Bye Laws
IEE Wiring Regulations
Health & Safety legislation

This appliance meets the requirements of IPX4D, ie degree of protection against moisture.
Failure to install this appliance correctly could lead to prosecution. It is in your own interest and that of safety to ensure that the law is complied with. Manufacturer's instructions must **NOT** be taken in anyway as over-riding statutory obligations.

Boiler Operating Instructions



1 - Heating on green light
2 - Heating temp. switch
3 - D.h.w. temperature switch
4 - D.h.w. operation green indicator light
5 - 0/SUMMER and CAR/WINTER switch
6 - Gaudium Magnum operating switch
7 - Gaudium Magnum operating indicator
8 - Storage tank thermometer
9 - Boiler pressure gauge
10 - Reset button
11 – Temperatures / diagnostics display
12 - Burner operating indicator

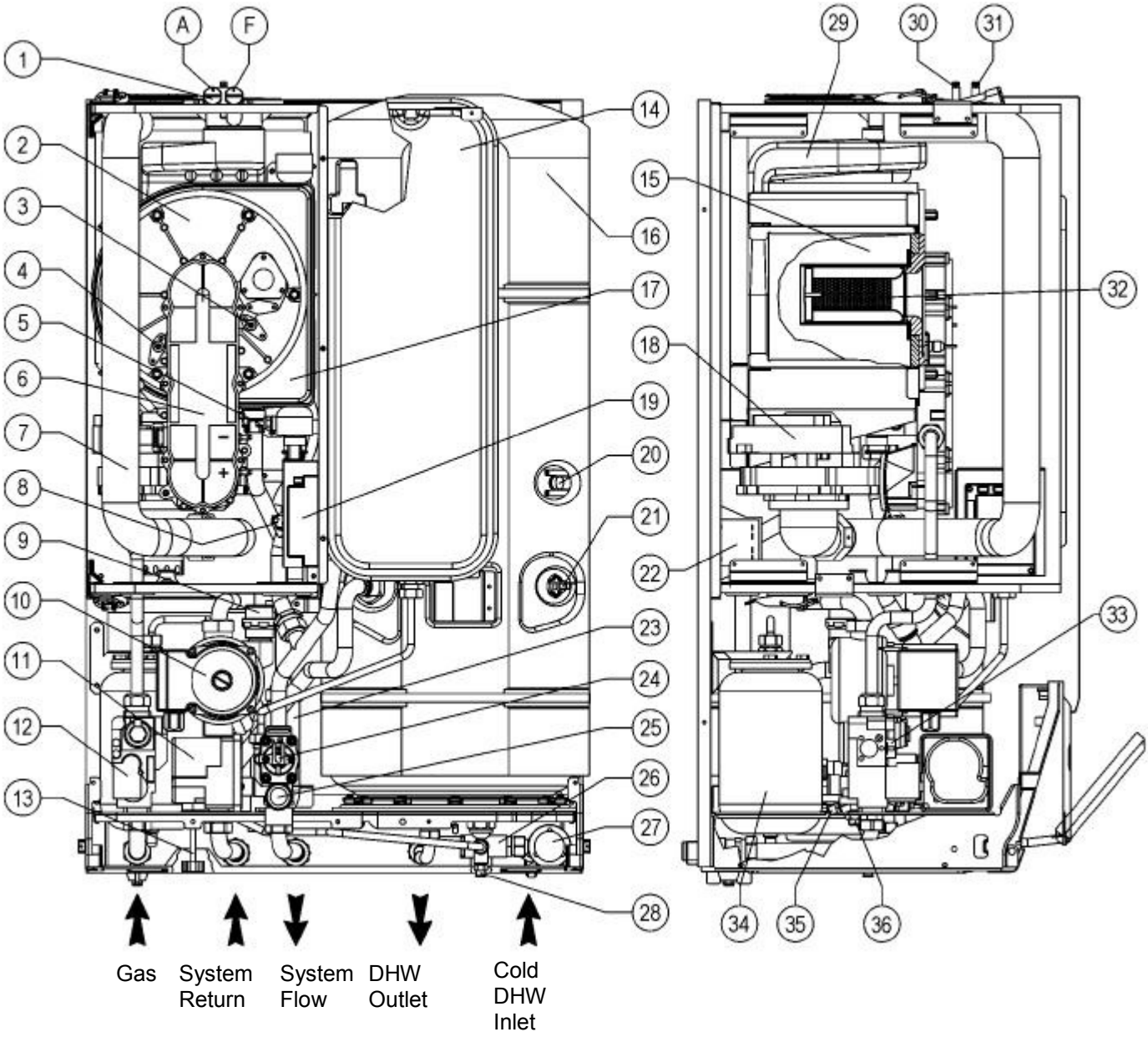
Using the Boiler

Before lighting, make sure that the system is full of water and that the manometer (9) indicates a pressure of 1 - 1.2 bar.
-Open the gas valve on the gas supply to the boiler.
-Turn main switch (5) to Hot Water or Hot Water/Heating.
N.B.: With the switch set to (🚿) the central Heating temperature setting is not active, and the domestic water temperature is controlled by selector (3). With the switch set to (🚿📻) the central heating temperature is set using selector (2) while selector (3) is used for the domestic hot water. Turn the selectors clockwise to raise the temperature, anticlockwise to lower it. Boiler operation is now automatic.
Gaudium Magnum System - When the Gaudium Magnum switch (6) is in the (🚿) position, the flow rate possible for domestic hot water is increased when the storage temperature is more than 50°C. If the temperature of the stored hot water drops below 41°C, the system is automatically disabled. Please see page 14 for further information on operating the boiler.

PERFORMANCE:		**Victrix 20**			**Victrix 27**		
Nominal Heat Input	*Kw*	24.0			32.6		
Min. Heat Input	*Kw*	5.0			6.6		
Nominal Heat Output (useful)	*Kw*	23.5			32		
Min. Heat Output	*Kw*	4.7			6.3		
GAS:		*G20*	*G30*	*G31*	*G20*	*G30*	*G31*
Nozzle diameter	*mm*	5.0	3.8	3.8	7.0	5.0	5.0
Supply Pressure	*Mbar*	20	29	37	20	29	37
***HEATING SYSTEM*:**							
Max Operating Pres. of Heating Unit	*bar*	3			3		
Max Operating Temp. of Heating Unit	*°C*	90			90		
Adjustable Heat Temp (range 1)	*°C*	25 - 85			25-85		
Adjustable Heat Temp (range 2)	*°C*	25 - 45			25-45		
Total Volume of expansion vessel	*l*	10			10		
Expansion Vessel preloading	*bar*	1.0			1.0		
Generator Water Content	*l*	60			60		
Available head capacity 1000 l/h	*kPa*	14.7			35.28		
Working Heat Output d.h.w production	*Kw*	23.5			32.0		
DHW adjustable temperature	*°C*	30-60			30-60		
Flow Limiting Device	*l/min*	8			12		
DHW circuit minimum pressure	*bar*	0.3			0.3		
DHW circuit max operating pressure	*bar*	8			8		
Continuous service supply capacity withΔ30ºC	*l/min*	11.2			15.2		
Capacity with ΔT 30ºC (10 mins)	*l/min*	19.3			23.3		
Minimum pressure for flow limiting device rated capacity	*bar*	1.0			1.0		
Full boiler Weight	*kg*	129			128		
Empty boiler weight	*kg*	75			74		
ELECTRICAL:							
Power Connection	*v/hz*	230/50			230/50		
Rated Power Input	*A*	0.59			0.90		
Installed Electrical Power	*W*	128			205		
Power absorbed by circulator	*W*	83			110		
Power absorbed by fan	*W*	20			43		
Appliance electrical system callout	*-*	IPX4D			IPX4D		
FLUE GASES:		*G20*	*G30*	*G31*	*G20*	*G30*	*G31*
Rated power fume mass flow	*kg/h*	39	33	33	51	46	53
Minimum power fume mass flow	*kg/h*	8	7	9	11	10	11
CO2 at nominal output	*%*	9.2	12.5	10.6	9.44	12.2	10.35
CO2 at minimum output	*%*	9.0	11.9	9.7	8.9	11.5	10.0
CO at O% O2 at minimum output	*ppm*	5	6	8	5	5	6
NOx at 0% of 02 at nominal output	*ppm*	36	268	61	37	115	21
NOx at 0% of O2 at minimum output	*ppm*	12	19	14	9	20	12
Temperature of fumes at rated output (50/30)	*ppm*	43	47	45	53	65	54
Temperature of fumes at min. output (50/30)	*ppm*	38	46	44	44	45	43

Boiler Dimensions:		**Minimum Clearances for servicing:**	
Height	900mm	Top	200mm
Depth	450mm	Bottom	150mm
Width	600mm	Side	20mm
Gas Connection	½"	Front	600mm
CH Connection	¾"		
DHW Connection	½"		

Main Boiler Components



1.Intake sockets (A= air) (F=fumes)	13. System filling cock	25.3-bar safety valve
2.Combustion chamber cover	14.Expansion vessel	26.8-bar safety valve
3.Ignition electrodes	15.Combustion chamber	27.Gaudium Magnum device
4.Detection electrode	16.SS storage tank 316L	28.Boiler emptying cock
5.Heating and limit NTC probe	17.Condensation module	29.Flue hood
6.Venturi duct	18.Fan	30.+ve signal pressure point
7.Air inlet pipe	19.Ignition & detection unit	31.-ve signal pressure point
8.Overheat safety thermostat	20.Max flow limit thermostat	32.Burner
9.Automatic air vent	21.DHW NTC probe	33.Gas valve outlet pres. test
10.Circulator	22.Voltage transformer	34.DHW expansion vessel
11.Motorised 3 way valve	23.Water trap (siphon)	35.System emptying cock
12.Gas Valve	24.No water safety flow switch	36.System adjustable bypass

General Installation Information

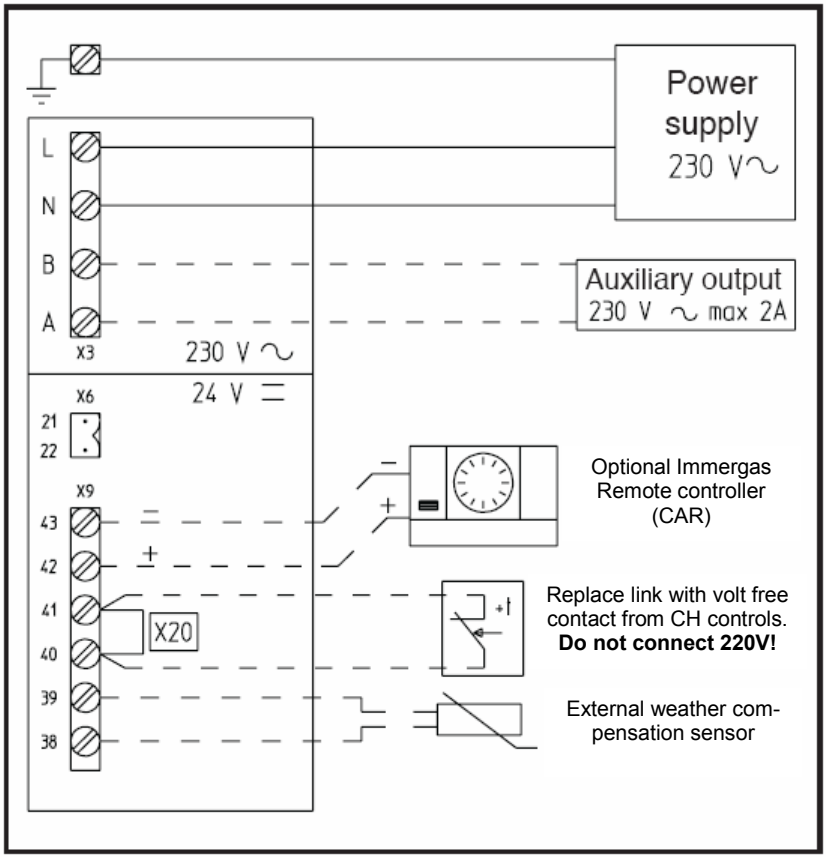
Gas Supply

The meter and supply pipes must be sized to deliver the gas rate and pressure given on page 3. The boiler requires at least a 22 mm (3/4") gas supply pipe. The complete installation, including the meter, must be tested for gas soundness and purged as described in IS 813:2002.

Electrical Installation

The boiler requires a 220/240 V ~ 50 Hz mains supply, fused at 3 A. **The boiler must be earthed.** The polarity of the supply must be correct as otherwise the boiler will not operate properly.

There must only be one common isolator, providing complete electrical isolation, for the boiler and any external controls. Using PVC insulated cable not less than 0.75 mm² (24 x 0.2 mm) to BS 6500 Table 16, the boiler should be connected to a fused three pin plug and unswitched shuttered socket outlet (both complying with BS 1363), or a fused double pole switch with a contact separation of at least 3 mm in both poles. Wiring external to the boiler must be in accordance with the current IEE Wiring Regulations.



Note: External controls connected to the boiler must be of the volt free type and are connected to terminals 40 and 41 as shown above.

Weather Compensation

A temperature sensor for outdoors is available as an optional accessory for the boiler. This should be fitted in an outdoor location which is not exposed to direct sunlight. A north facing wall is a good location.
If the optional weather compensation sensor is used, it should be connected to terminals 38 and 39 as shown above using a two core cable. If this cable is routed in close proximity to cables carrying mains voltages, then screened cable should be used. Contact RVR for more information.
When the sensor is connected, the boiler adapts it's flow temperature to suit the prevailing weather conditions. This results in lower energy usage and enhanced comfort.

WARNING ! - Connection of a voltage to any boiler terminals other than the mains lead will result in destruction of the boiler control panel. The product warranty does not cover this type of damage.

Clearances and Air Supply

The boiler does not require any air vents for cooling in the room in which it is installed or when installed in a cupboard or compartment. The minimum clearances for servicing must always be maintained. Please see table on page 3. **Note:** A cupboard or compartment used to enclose the boiler must be designed and constructed specifically for the purpose.

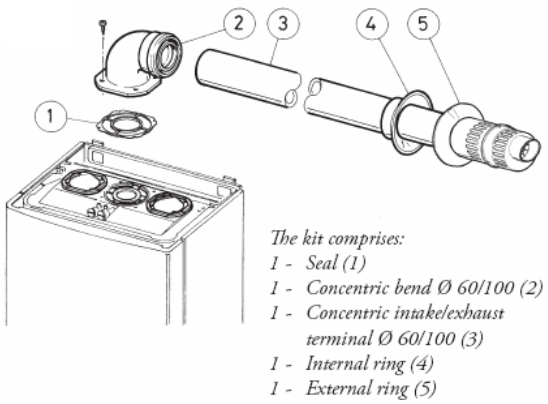
Flue Systems

When the boiler is installed on an external wall, the standard horizontal concentric 60/100 flue kit will normally be used to flue the boiler. This is shown in the diagram.

It is often necessary to install a longer flue system to cater for site conditions. There are several different flue system sizes available for the Victrix Zeus 20/27 boiler.

Horizontal concentric kit 60 /100

Install the bend with flange (2) on the central hole of the boiler inserting the seal (1) with the round protrusions facing downwards in contact with boiler flange and tighten using the screws supplied with the kit.
Fit the smooth male end of the 60/100 concentric terminal pipe (3) until it reaches to the stop on the female end of the bend (2), making sure the internal and external sealing rings are fitted; this will ensure the connection is properly sealed. Additional extensions and bends may be installed if required using the same method.
Ensure that all seals are fitted and that the outer and inner pipes are installed so that all joints are perfectly sealed. Ensure that the terminal is installed the right way up.



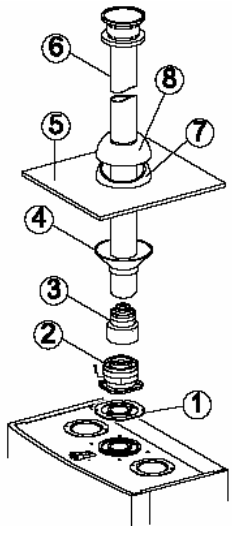
The kit comprises:
1 - Seal (1)
1 - Concentric bend Ø 60/100 (2)
1 - Concentric intake/exhaust terminal Ø 60/100 (3)
1 - Internal ring (4)
1 - External ring (5)

A lubricant may assist in overcoming the friction of the seals. Oils and conventional greases are not compatible with the EPDM seals used and should never be used for this purpose. Silicone sprays are compatible with EPDM and may be used. Please contact RVR for more information.

A supporting clamp should be installed every three meters. The flue system should be slightly inclined so that any condensate flows towards the boiler. This avoids any drips from the external flue terminal.
The maximum possible overall length after the first bend (2) is 12.9 straight and horizontal meters. See the section on extended flue design for more information.

Vertical concentric kit 60 /100

Install the concentric flange (2) on the central hole of the boiler inserting the seal (1) with the round protrusions facing downwards in contact with boiler flange and tighten using the screws supplied with the kit.
Fit the male end (smooth) of the adapter (3) in the female end of the concentric flange (2) until it reaches the stop on the female end of the flange, making sure the internal and external sealing rings are fitted; this will ensure the connection is properly sealed. Additional extensions and bends may be installed if required using the same method.
Installing the flashing- Replace tiles with the aluminium sheet (5), shaping it to ensure that the rainwater runs off. Position the fixed half-shell (7) on the aluminium tile and insert the intake/exhaust pipe (6). Fit the male end (6)(smooth) of the 60/100 concentric terminal up to the stop on the female end of the adapter(3), making sure that the ring (4) is already fitted; this will ensure hold and joining of the elements making up the kit.
Ensure that all seals are fitted and that the outer and inner pipes are installed so that all joints are perfectly sealed. A lubricant may assist in overcoming the friction of the seals. Oils and conventional greases are not compatible with the EPDM seals used and should never be used for this purpose. Silicone sprays are compatible with EPDM and may be used. Please contact RVR for more information.



The kit comprises:
1 - Seal (1)
1 - Female concentric flange (2)
1 - Adapter from 80/125 to 60/100 (3)
1 - Ring (4)
1 - Aluminium tile (5)
1 - Intake/exhaust concentric pipe Ø 60/100 (6)
1 - Fixed half-shell (7)
1 - Movable half-shell (8)

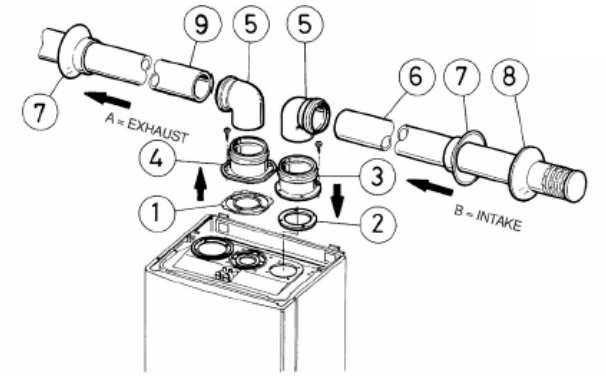
A supporting clamp should be installed every three meters.
The maximum possible overall length including the terminal is 13.4 straight and horizontal meters.

NB: If the terminal or extension pipes need shortening ensure that the inner pipe protrudes by 5mm with respect to the external pipe.

Separated Flue Systems

Separated 80/80 flue kit

This kit enables separation of the exhaust and air intake pipes as shown in the figure.
Combustion products are expelled from pipe (A) (in plastic material resistant to acidic condensates). Air is taken in through pipe (B) (also in plastic material) for combustion.
Intake pipe (B) can be installed either on the right or left hand side of the central exhaust pipe (B). Both pipes can be oriented in any direction.



The kit comprises:

- *1 - Exhaust seal (1)*
- *1 - Flange seal (2)*
- *1 - Female intake flange (3)*
- *1 - Female exhaust flange (4)*
- *2 - Bends 90° Ø 80 (5)*
- *1 - Intake terminal Ø 80 (6)*
- *2 - Internal rings (7)*
- *1 - External ring (8)*
- *1 - Exhaust pipe Ø 80 (9)*

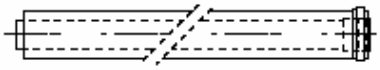
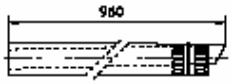
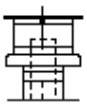
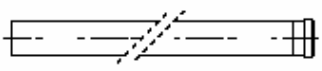
Assembly:
Install the flange (4) on the central hole of the boiler inserting the seal (1), positioning it with the round protrusions downwards in contact with the boiler flange and tighten using the screws supplied with the kit.
Remove the sealing plate from the air intake and replace it with flange (3)inserting seal (2) which is already fitted on the boiler and tighten using the screws supplied.
Insert bends (5) with the male end (smooth) in the female end of the flanges (3&4). Fit the male end of the intake terminal (6) up to the stop on the female end of the bend (5), making sure that the relevant internal and external sealing rings are fitted. Fit the male of the exhaust pipe up to the stop on the female end of the bend, making sure that the internal sealing ring is fitted; this will ensure a seal and joining of the elements making up the kit.

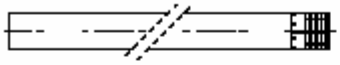
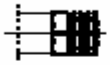
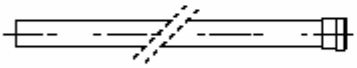
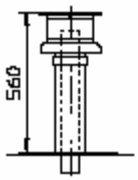
A lubricant may assist in overcoming the friction of the seals. Oils and conventional greases are not compatible with the EPDM seals used and should never be used for this purpose. Silicone sprays are compatible with EPDM and may be used. Please contact RVR for more information.
A supporting clamp should be installed every three meters. The flue system should be slightly inclined so that any condensate flows towards the boiler. This avoids any drips from the external flue terminal.

The maximum possible overall length without any bends is 36 straight, horizontal meters or 41 straight, vertical meters regardless of whether they are used in intake or exhaust. See the section on extended flue design for more information.

Flue calculations for more complex systems

Each component of the air inlet/flue system has a resistance factor . These are given in the following tables. The resistance factor varies depending on whether the component in question conveys fresh inlet air or hot combustion gases. All boilers have a maximum resistance factor of 100. The sum of all components in the flue system must not exceed the maximum overall resistance factor of 100.

TYPE OF DUCT	Resistance factor (R)	Equivalent length in metres of concentric pipe Ø 60/100	Equivalent length in metres of pipe Ø 80	Equivalent length in metres of pipe Ø 60
Concentric pipe Ø 60/100 length 1 m 	Intake and exhaust 6.4	**1 m**	Intake 7.3 m Exhaust 5.3 m	Exhaust 1.9 m
90° bend concentric Ø 60/100	Intake and exhaust 8.2	**1.3 m**	Intake 9.4 m Exhaust 6.8 m	Exhaust 2.5 m
45° bend concentric Ø 60/100	Intake and exhaust 6.4	**1 m**	Intake 7.3 m Exhaust 5.3 m	Exhaust 1.9 m
Terminal complete with concentric horizontal intake-exhaust Ø 60/100 	Intake and exhaust 15	**2.3 m**	Intake 17.2 m Exhaust 12.5 m	Exhaust 4.5 m
Terminal complete with concentric horizontal intake-exhaust Ø 60/100	Intake and exhaust 10	**1.5 m**	Intake 11.5 m Exhaust 8.3 m	Exhaust 3.0 m
Terminal complete with concentric vertical intake-exhaust Ø 60/100	Intake and exhaust 16.3	**2.5 m**	Intake 18.7 m Exhaust 13.6 m	Exhaust 4.9 m
Terminal complete with concentric vertical intake-exhaust Ø 60/100 	Intake and exhaust 9	**1.4 m**	Intake 10.3 m Exhaust 7.5 m	Exhaust 2.7 m
Concentric adapter from Ø 80/125 to 60/100	Intake and exhaust 5.2	**0.8 m**	Intake 6.0 m Exhaust 4.3 m	Exhaust 1.6 m
Concentric flange Ø 80/125	Intake and exhaust 1.3	**0.2 m**	Intake 1.5 m Exhaust 1.1 m	Exhaust 0.4 m
Pipe Ø 80 length 1 m 	Intake 0.87 Exhaust 1.2	0.1 m 0.2 m	**Intake 1.0 m** **Exhaust 1.0 m**	Exhaust 0.4 m

TYPE OF DUCT	Resistance Factor (R)	Equivalent length in metres of concentric pipe Ø 60/100	Equivalent length in metres of pipe Ø 80	Equivalent length in metres of pipe Ø 60
Complete intake terminal Ø 80 length 1 m 	Intake 3	0.5 m	**Intake 3.4 m**	Exhaust 0.9 m
Intake terminal Ø 80 Exhaust terminal Ø 80 	Intake 2.2	0.35 m	**Intake 2.5 m**	Exhaust 0.6 m
	Exhaust 1.9	0.3 m	**Exhaust 1.6 m**	
90° bend Ø 80	Intake 1.9	0.3 m	**Intake 2.2 m**	Exhaust 0.8 m
	Exhaust 2.6	0.4 m	**Exhaust 2.1 m**	
45° bend Ø 80	Intake 1.2	0.2 m	**Intake 1.4 m**	Exhaust 0.5 m
	Exhaust 1.6	0.25 m	**Exhaust 1.3 m**	
Pipe 1 m Ø 60 for ducting 	Exhaust 3.3	0.5 m	Intake 3.8 m Exhaust 2.7 m	**Exhaust 1.0 m**
90° bend Ø 60 for ducting	Exhaust 3.5	0.55 m	Intake 4.0 m Exhaust 2.9 m	**Exhaust 1.1 m**
Adapter Ø 80/60	Intake and exhaust 2.6	0.4 m	Intake 3.0 m Exhaust 2.1 m	**Exhaust 0.8 m**
Complete vertical exhaust terminal Ø 60 for ducting 	Exhaust 12.2	1.9 m	Intake 14 m Exhaust 10.1 m	**Exhaust 3.7 m**

Example:
Flue system consists of 9m of 80mm air intake pipe with 3 x 90˚ bends and 6m of exhaust pipe with 2 x 90˚ bends.
Component Resistances:

Component	Resistance	Quantity	Total
80mm Intake pipe	0.87	9	7.83
90˚ air intake bend	1.9	3	5.7
80mm Flue pipe	1.2	6	7.2
90˚ Flue bend	2.6	2	5.2
	Total Flue Resistance		25.93

In this case the total resistance of the system is less than 100. The flue design is acceptable.

FLUE TERMINAL LOCATION

Fig. 4

Terminal Position	Min. Distance
A Directly below an opening, air brick, windows, etc.	300 mm
B Below gutters, soil pipes or drain pipes	75mm
C Below eaves	75mm
D Below balconies or car port roof	75mm
E From a vertical drain pipe of soil pipe	75mm
F From an internal or external corner	75mm
G Above ground, roof or balcony level	300mm
H From a surface facing the terminal	600mm
I From a terminal facing a terminal	1200mm
J From an opening in the car port (door, window) into dwelling	1200mm
K Vertically from a terminal on the same wall	1500mm
L Horizontally from a terminal on the same wall	300mm
M Horizontally from an opening, air brick, window etc.	300mm
Below horizontally hinged windows where exhaust is directed upwards	3000mm
Below horizontally hinged windows where exhaust is not directed upwards	1000mm

The flue terminal must be exposed to the external air and the position must allow the free passage of air across it at all times. In certain weather conditions the terminal may emit a plume of steam. Avoid positioning the terminal where this may cause a nuisance. If the terminal is fitted within 850 mm of a plastic or painted gutter or 450 mm of painted eaves or 300 mm of a plastic car port roof, an aluminium shield at least 1 m long should be fitted to the underside of the gutter or painted surface. If the terminal is fitted less than 2 m above a surface to which people have access, the terminal must be protected by a terminal guard.

IMPORTANT— Failure to install flue systems correctly may lead to serious injury or death. Ensure that:

- Only flues specifically designed for condensing boilers and provided by RVR Energy Technology Limited are used.
- The flue slopes slightly towards the boiler by between 1 and 2 degrees to ensure any condensate flows towards the boiler. Failure to do this will result in condensate dripping from the flue terminal.
- The flue is adequately supported along it's length so that it is straight and cannot be moved without using a tool.
- The flue system has no low points where condensate can collect.
- All flue terminals are securely fixed.
- No chemicals, detergents, solvents or liquids of any kind are used in the assembly of the flue system. Talc may be used as a lubricant where necessary.
- All joints and connections are properly assembled to prevent leakage and all seals are properly seated.
- The flue is thoroughly tested for leaks after installation.

Boiler Location

The boiler is not suitable for external installation.
The boiler must be installed on a flat vertical wall which is capable of supporting the weight of the boiler.
The boiler can be fitted to or adjacent to a wall comprising of a combustible material without the need for a special thermal insulation barrier.

The boiler may be installed in any room or internal space, although particular attention is drawn to the requirements of the current IEE Wiring Regulations. Where a room sealed boiler is installed in a room containing a bath or shower, it must not be possible for a person using the bath or shower to touch any electrical switch or boiler control utilising mains electricity.
The boiler may be installed in a cupboard or compartment, provided it is correctly designed for that purpose.

NB: Adequate clearances are required to allow servicing of the boiler. Please see page 3.

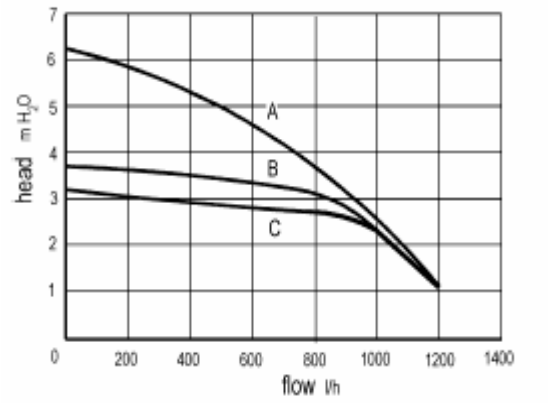
Central Heating System

The boiler is designed for use in a sealed central heating system. The system should be designed to operate with flow temperatures of up to 80°C. When designing the system, the pump head, expansion vessel size, mean radiator temperature, etc. must be taken into account.
The pressure losses in the system must be compatible with the boiler circulation pump. See pump performance graph below:

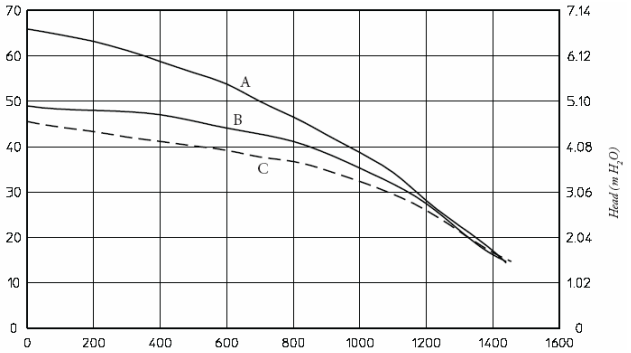
Pump performance curves

Flow—Head Graph:
The pump head depends on how the system bypass is adjusted.

Victrix 20



Victrix 27



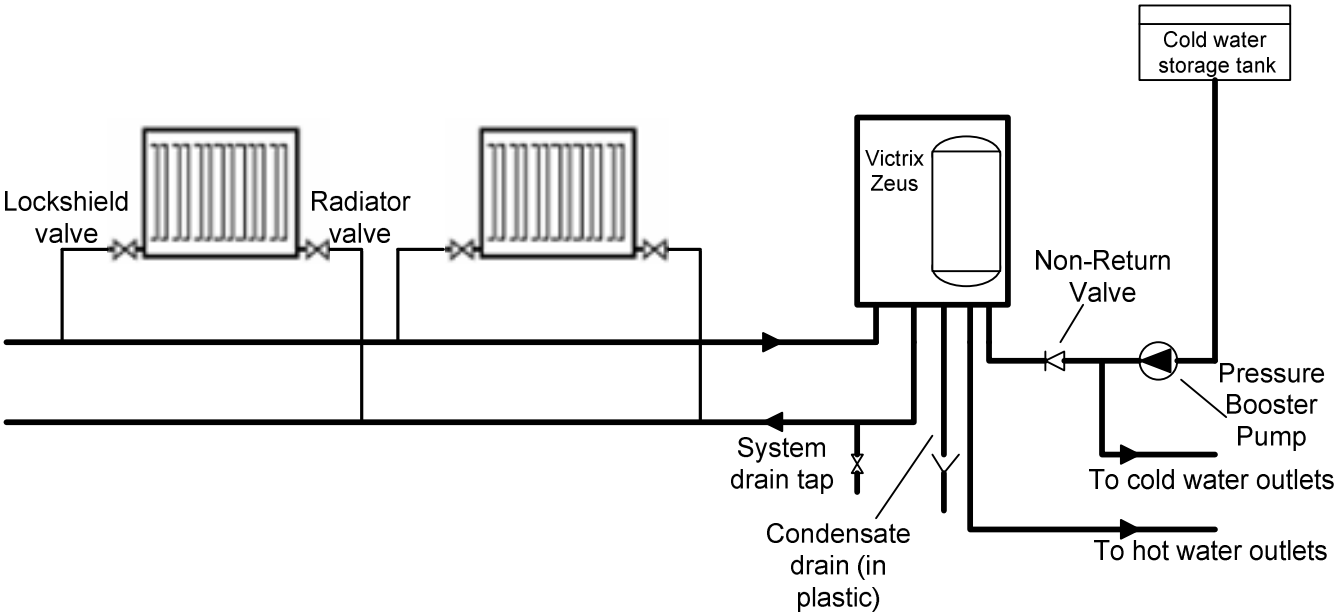
A. Head available at max pump speed with by-pass closed (adjustment screw fully screwed in)
B. Head available at max pump speed (screw tightened 4 to 5 turns - bypass partially open)
C. Head available at max pump speed with by-pass open (adjustment screw fully unscrewed)

System volume - The 10 litre expansion vessel incorporated into the boiler is pre-charged to 1.0 bar and is suitable for a sealed heating system with a maximum water content of 100 litres. Above 100 litres, consideration should be given to fitting an additional expansion vessel. To check correct operation of the expansion vessel(s) the system pressure should not be more than 2.5 bar when the system is at maximum operating temperature.

The boiler is supplied with the following components built in:-
Central Heating Pressure relief valve - complying with BS 6759 and set to operate at 3 bar. The discharge pipe must be routed clear of the boiler to a drain, so that it can be seen, but cannot cause injury to persons or property.
A Pressure gauge is included to indicate the pressure of the central heating system.

The most important components of the system are shown in the diagram below.

- The cold water supply for the water heating side of the system may come from a booster pump or the cold water mains where this is permitted by the local authority.
- A non-return valve must be installed on the cold feed to the boiler. This prevents expanding hot water back-feeding into the cold side of the system.
- The boiler includes an automatic bypass. It is not necessary to make any further provision for system bypasses.
- The boiler condensate outlet must be connected to a drain. Metal pipes must not be used for this purpose as the slightly acidic condensate will lead to rapid corrosion. Plastic must be used for this purpose.

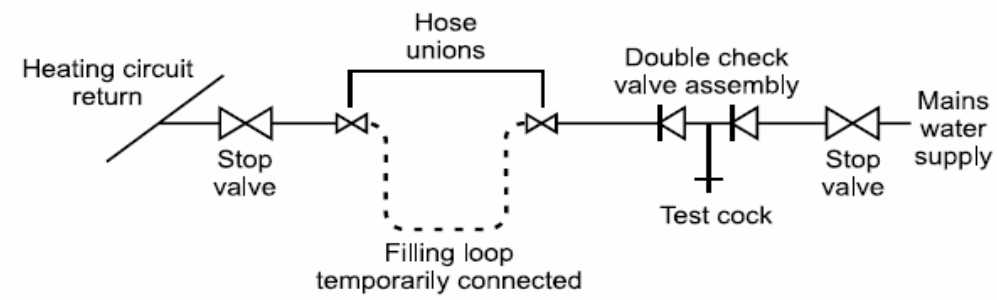


Filling the central heating system

The system design pressure (cold) should be set to 1.0 bar. This pressure is equivalent to a static head of 10.2 metres of water. Provision should be made to replace water lost from the system. This can be by manual or automatic means.

Filling of the system must be carried out in a manner approved by the local authority. Where allowed, the system may be filled via a temporary connection as shown below or by using the integrated filling valve in the boiler. After filling, always disconnect the flexible hose of the filling loop if used and close the filling valve in the boiler.

All fittings used in the system must be able to withstand pressures up to 3 bar. Drain taps (to BS 2879) must be used to allow the system to be completely drained. The heating system should be thoroughly flushed before the boiler is connected and again after the first heating. If it is necessary to add inhibitor to



the central heating system, contact RVR Ltd. for guidance.

Domestic Hot Water System

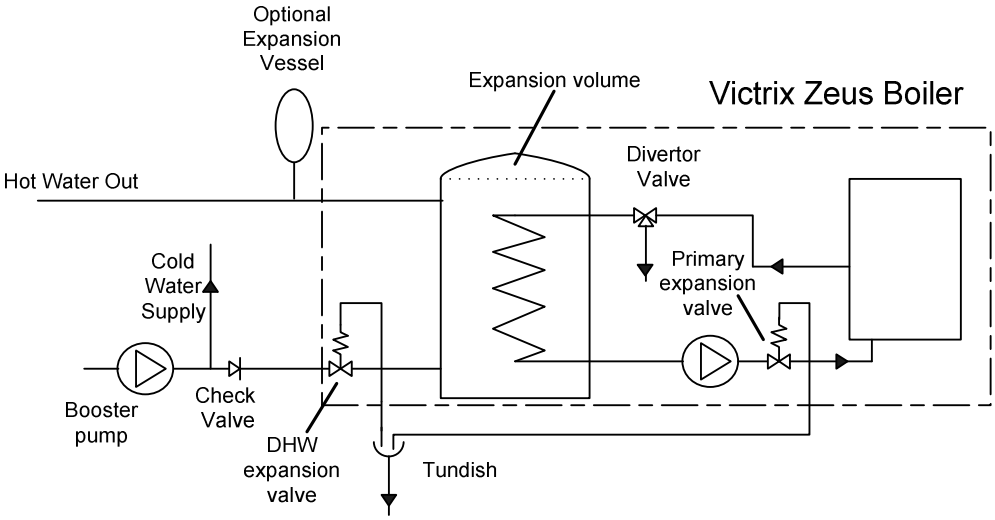
Mains water pressurised unvented system are generally not permitted in Ireland. A cold water storage tank and a pressure boosting pump will normally provide a pressurised cold water supply. The pressurisation pump should provide a water pressure of between 1 and 3 bar. However, all taps and mixing valves used with the hot water system must be suitable for operating at a pressure of up to 5.5 bar. The use of fittings designed for open, low pressure systems should be avoided as this will lead to excessive water flow rates. To ensure economic use, the pipe runs between the boiler and taps should be in 15 mm copper pipe and be as short as possible. Where possible the pipe work should be insulated to reduce heat loss.

Before the cold water supply pipe is connected to the boiler, it should be thoroughly flushed out to avoid the danger of dirt or foreign matter entering the boiler.
The stored water temperature is adjustable to a maximum of 55°C. In hard water areas this should avoid possible scale build-up. However, if descaling is necessary contact RVR Limited for guidance.

Unvented Hot Water Storage System

The installation is subject to Building Regulations and the Water Bye Laws of the Local Authority.
The Victrix Zeus 20/27 boiler is supplied with all the components required for a safe and efficient unvented hot water system. An air cushion which is present at the top of the 54l storage vessel provides some of the expansion for the domestic hot water system. The balance is provided by the additional DHW expansion vessel installed within the boiler casing.
NOTE: In the Dublin City Council area, the council requires that the minimum internal diameter of pipes connected to the boiler DHW connections should not be less that 13mm. As 1/2" thermoplastic pipe does not provide the minimum diameter, the minimum suitable thermoplastic pipe size is 3/4"

Discharge pipe - The discharge pipes from the expansion relief valves must be routed to a tundish in 1/2" (or 15 mm)pipe. The discharge pipe work from both relief valves may be joined together in the same sized pipe, providing at least 3/4" (or 22 mm) pipe work is connected downstream of the tundish.



Tundish - The tundish must be positioned within 500 mm of the appliance, so that it is visible to the User and away from electrical devices. The minimum size of the discharge pipe downstream of the tundish is given in the following table.

Table 1	Sizing of copper discharge pipe 'D2' - refer also to Fig. 9			
Valve outlet size	Minimum size of discharge pipe 'D1' to tundish	Minimum size of discharge pipe 'D2' from tundish	Maximum resistance allowed, expressed as a length of straight pipe (i.e. no elbows or bends)	Resistance created by each elbow or bend
G½	15mm (1/2")	22mm (3/4")	up to 9 m	0.8 m
		28mm (1")	up to 18 m	1.0 m
		35mm (11/4")	up to 27 m	1.4 m

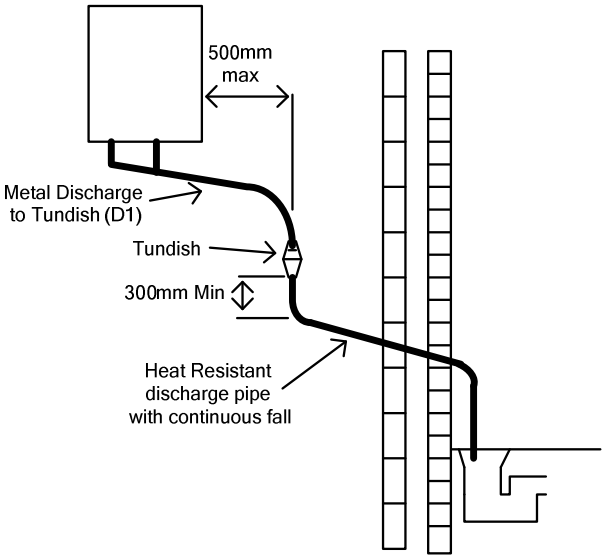
Tundish installation

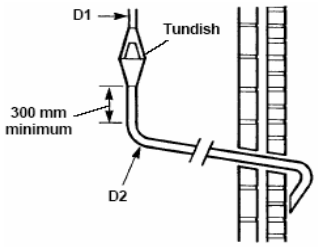
The discharge pipework from the tundish:-

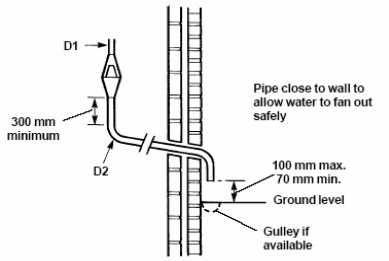
1. Shall fall continuously through its length.
2. Shall be of a heat resistant material, e.g. metal.
3. Shall not be fitted with any valves or taps.
4. Shall discharge to a safe visible position, e.g. onto the surface of an external wall or into a gulley.
5. Shall have a minimum of 300 mm straight pipework directly from the tundish.

Note: Where children may play or otherwise come into contact with discharges, a wire cage or similar guard must be positioned to prevent contact whilst maintaining visibility.

Please see the diagrams below for suggested methods of terminating the discharge pipe safely. Where a single pipe serves a number of discharges, such as in blocks of flats, the number served should be limited to not more than 6 systems so that any installation can be traced reasonably easily. The single common discharge pipe should be at least one pipe size larger than the largest individual discharge pipe to be connected. If the system is installed where discharges from safety devices may not be apparent, i.e. in dwellings occupied by blind, infirm or disabled people, consideration should be given to the installation of an electronically operated device to warn when discharge takes place.

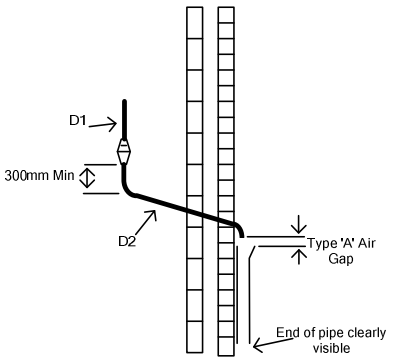






High Level Termination

At high level, discharge onto a roof is acceptable providing the roof is capable of withstanding high temperatures and there is a distance of 3 m from any plastic guttering systems that would collect such discharge.



Example:-

The example below is for a G½ temperature relief valve with a discharge pipe (D2) having four elbows and a length of 7 m from the tundish to the point of discharge.

From Table :-

Maximum resistance allowed for a straight length of 22 mm copper discharge pipe (D2) from a G½ temperature relief valve is 9 m. Subtract the resistance for four 22 mm elbows of 0.8 m each = 3.2 m. Therefore the maximum permitted length equates to 9 - 3.2 = 5.8 m

5.8 m is less than the actual length of 7 m therefore calculate the next largest size.

Maximum resistance allowed for a straight length of 28 mm pipe (D2) from a G½ temperature relief valve equates to 18 m.

Subtract the resistance for four 28 mm elbows at 1.0 m each = 4 m.

Therefore the maximum permitted length equates to 18 - 4 = 14 m

As the actual length is 7 m, a 28 mm (D2) copper pipe will be satisfactory.

Operation and Maintenance Instructions

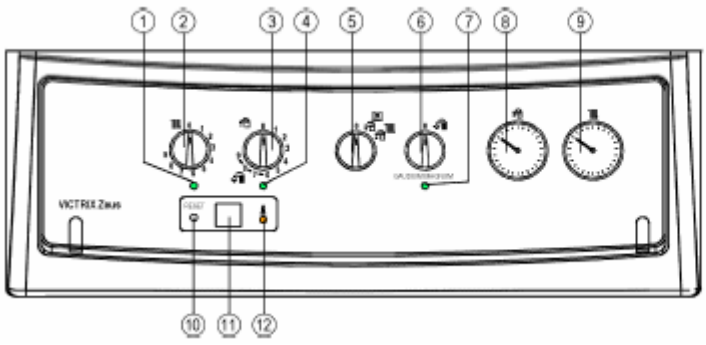
An annual maintenance of the boiler and heating system is recommended. This ensures that the optimal safety, performance and operation characteristics of the boiler remain unchanged over time.

Warnings

Never expose the wall-mounted boiler to direct vapours from a cooking surface. Use of the boiler by un-skilled persons or children is strictly prohibited.
Never touch the flue extraction terminal (if fitted) due to the risk of burning caused by high temperatures;
For safety purposes, check that the concentric air intake/flue exhaust terminal (if fitted), is not blocked. If temporary shutdown of the boiler is required, proceed as follows:
a) drain the heating system if anti-freeze is not used;
b) shut off all electrical, water and gas supplies.
When building or renovation work is carried out in the vicinity of the flue outlet, switch off the boiler and on completion of work ensure that a qualified technician checks the safety of the installation. Never clean the appliance or connected parts with flammable substances. Never leave containers or flammable substances in the same environment as the appliance.

Electrical Safety

- never touch the appliance with wet hands or other parts of the body and never touch when barefoot.
- never pull electrical cables or leave the appliance exposed to atmospheric agents (rain, sunlight, etc.);
- the appliance power supply cable must never be replaced by the user;
- in the event of damage to the cable, switch off the appliance and contact a qualified service technician.
- in the event of prolonged periods when the boiler is not in use, turn off the main power switch.



1 - Heating on green light
2 - Heating temp. switch
3 - D.h.w. temperature switch
4 - D.h.w. operation green indicator light
5 - 0/SUMMER and CAR/WINTER switch
6 - Gaudium Magnum operating switch
7 - Gaudium Magnum operating indicator
8 - Storage tank thermometer
9 - Boiler pressure gauge
10 - Reset button
11 – Temperatures / diagnostics display
12 - Burner operating indicator

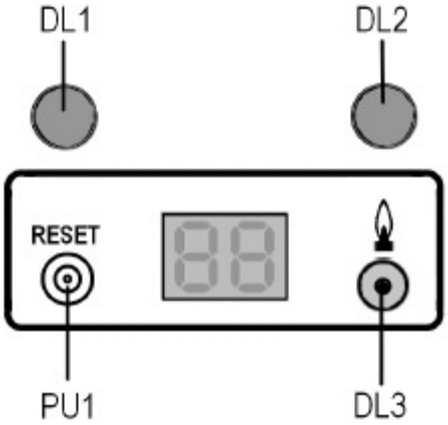
Using the Boiler

Before lighting, make sure that the system is full of water and that the manometer (9) indicates a pressure of 1 - 1.2 bar.
-Open the gas valve on the gas supply to the boiler.
-Turn main switch (5) to Hot Water or Hot Water/Heating.
N.B.: With the switch set to (🚿) the central Heating temperature setting is not active, and the domestic water temperature is controlled by selector (3). With the switch set to (🚿 ||||) the central heating temperature is set using selector (2) while selector (3) is used for the domestic hot water. Turn the selectors clockwise to raise the temperature, anticlockwise to lower it. Boiler operation is now automatic.
Gaudium Magnum System - When the Gaudium Magnum switch (6) is in the (🚿) position, the flow rate possible for domestic hot water is increased when the storage temperature is more than 50°C. If the temperature of the stored hot water drops below 41°C, the system is automatically disabled. Please see page 14 for further information on operating the boiler.

Antifreeze functions:
The boiler is equipped with an anti-freeze system in both central heating and hot water modes:
When the temperature measured in the central heating system falls below 4 C, the boiler is automatically fired until a boiler temperature of 35ºC is achieved.
When the temperature measured in the hot water tank falls below 4 C, the boiler is automatically fired until a boiler temperature of 8ºC is achieved.

Operation and Maintenance Instructions

Boiler display and indicators



DL1 - Green LED that comes on when the boiler is operating in heating or antifreeze mode.
DL2 - Green LED that comes on when the boiler is working in domestic hot water mode.
DL3 - Orange LED that comes on when the burner is operating.

LCD Display unit

Depending on conditions, the LCD display indicates:
- The boiler supply temperature.
- The value set during heating and DHW temperature adjustment (for a time of 5 seconds after setting the temperature using the selector switch)
- the wording EC (external controls) with the optional CAR remote control is used.
- Fault conditions, the code number corresponding to the fault is displayed:

01 = Lockout due to ignition failure
02 = Lockout due to overheat thermostat triggering
05 = breakage of heating NTC sensor (NR)
10 = no-water safety device
12 = NTC DHW sensor failure (storage tank)
14 = incorrect ignition unit and board connection / faulty ignition unit
16 = fan failure (faulty fan)
17 = incorrect fan speed
26 = no-water safety switch closed with pump not working
31 = incompatible remote control

Reset Button

The Reset button is used to reset certain faults. A reset will occur when the button is pressed.

Maintenance Operations:

Lack of water in boiler.
Not enough water pressure detected in the heating circuit to guarantee correct boiler operation. Make sure that the pressure in the system is between 1and1.2 bar. N.B. Close the valve on completion. If pressure valves reach around 3 bar the safety valve may be activated. In this case contact a professional technician for assistance. In the event of frequent pressure drops, contact qualified personnel for assistance to eliminate system leakage.

System flow NTC sensor fault.
If the unit detects a problem with the system delivery NTC sensor, the boiler will not start; call a qualified technician.

Domestic circuit NTC sensor fault.
If the unit detects a problem in the domestic circuit NTC sensor, the boiler will not produce domestic hot water; call a qualified technician.

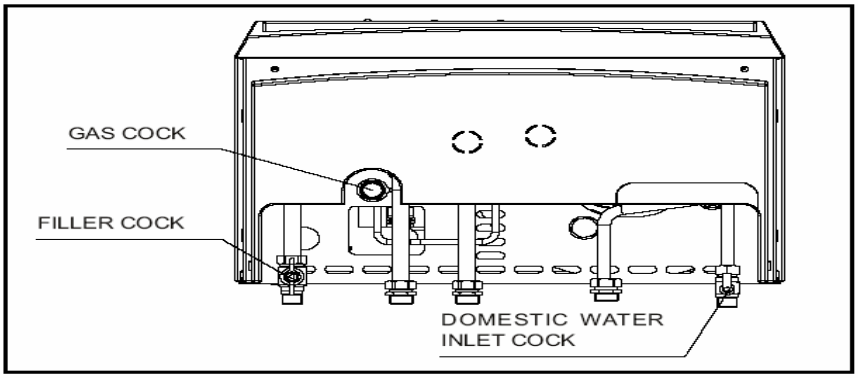
No water circulating.
This occurs if there is overheating in the boiler due to insufficient water circulation through the boiler - check that no shutoff devices are closed and that the system is free of air . Check that the circulating pump is running freely. If necessary, remove the pump cover screw and manually rotate the pump impellor using a flat bladed screwdriver. If lockout occurs repeatedly, contact a qualified technician for assistance.

Draining the system.
To drain the boiler, use the special drain cock. Before draining, ensure that the filling valve is not connected closed.

Draining the boiler.
To drain the boiler, use the special drain cock. N.B.: Before carrying out this operation, close the boiler cold water inlet cock and open any domestic circuit hot water cock to allow air to enter the boiler.

Anti-freeze protection.
The boiler comes standard with an anti-freeze function that starts the pump and burner when the water temperature inside the boiler falls below 4°C and stops on exceeding 35°C. The anti-freeze function is guaranteed if the boiler is fully operative and not in “lockout” status, and is electrically connected with the main switch set to Summer or Winter. To avoid continued operation in the event of prolonged absence, the system must be drained completely or anti-freeze substances should be added to the heating system water. In both cases the boiler domestic water circuit must be drained. In appliances subject to frequent draining, the system must be refilled with suitably treated water to eliminate hardness that may cause lime scale formation.

Decommissioning:
In the event of permanent shutdown of the boiler, contact professional personnel for the procedures and ensure that the electrical, water and gas supply lines are shut off and disconnected.



Casing Cleaning:
Use damps cloths and neutral detergent to clean the boiler casing. Never use abrasive or powder detergents.

Annual maintenance procedures

The following checks and maintenance should be performed at least once a year.
- Clean the flue side of the heat exchanger.
- Clean the main burner.
- Make a visual inspection of the flue extraction hood for wear or corrosion.
- Ensure correct ignition and operation.
- Ensure correct settings of the burner in domestic water and heating modes.
- Verify correct operation and adjustment of the boiler, in particular:
- operation of the electrical main switch on the boiler;
- operation of the system control thermostat;
- operation of the domestic water control thermostat.
- Ensure gas soundness of the gas intake circuit; insert a “U” or digital type pressure gauge in the pressure test point upstream of the gas valve and then close the boiler shutoff valve. No pressure variation must occur in the next five minutes on the gauge.
- Ensure activation of the device for protection against the ionisation flame control gas; activation time must be less than ten seconds
- Visually inspect to check for leakage of water or oxidation of fittings.
- Check visually that the water safety valve outlets are not blocked and that the tundish is clear.
- Check that the charge of the expansion vessel after discharging system pressure to the zero setting (check via boiler pressure gauge), is at 1,0 bar.
- Check that the system static pressure (in cold conditions and after system recharging via the filling valve) is between 1 and 1.2 bar.
- Check visually that the safety and control devices have not been tampered with and/or shorted, in particular:
- temperature safety thermostat;
- air pressure switch.
- Check the integrity of boiler Magnesium Anode.
- Ensure correct maintenance and condition of the electrical installation with particular reference to:
electrical cables must be correctly routed
no traces of black marking or burns

Variable Heat Output:

Victrix 20:

		METHANE (G20)			BUTANE (G30)			PROPANE (G31)		
HEAT OUTPUT	HEAT OUTPUT	GAS FLOW-RATE BURNER	NOZZLE PRESSURE BURNER		GAS FLOW-RATE BURNER	NOZZLE PRESSURE BURNER		GAS FLOW-RATE BURNER	NOZZLE PRESSURE BURNER	
(kW)	(kcal/h)	(m^3/h)	(mbar)	(mm H_2O)	(kg/h)	(mbar)	(mm H_2O)	(kg/h)	(mbar)	(mm H_2O)
23.5	20210	2.54	5.77	58.9	1.89	5.29	54.0	-	-	-
22.0	18920	2.38	5.09	51.9	1.77	4.59	46.8	-	-	-
20.0	17200	2.16	4.25	43.3	1.61	3.74	38.2	1.59	5.30	54.1
18.0	15480	1.95	3.50	35.7	1.45	3.00	30.6	1.43	4.30	43.9
16.0	13760	1.74	2.82	28.8	1.29	2.34	23.9	1.28	3.40	34.7
14.0	12040	1.53	2.22	22.7	1.14	1.78	18.1	1.12	2.60	26.5
12.0	10320	1.32	1.69	17.3	0.98	1.30	13.3	0.97	1.90	19.4
10.0	8600	1.11	1.23	12.6	0.82	0.91	9.3	0.81	1.40	14.3
8.0	6880	0.89	0.84	8.6	0.67	0.60	6.1	0.66	0.90	9.2
6.0	5160	0.68	0.52	5.3	0.50	0.38	3.9	0.50	0.60	6.1
4.7	4000	0.53	0.34	3.5	0.39	0.28	2.9	0.39	0.40	4.1

N.B.: Pressure values specified in the table indicate the difference of pressure values between the gas valve outlet and the combustion chamber. Adjustments are carried out using a differential pressure gauge.

Victrix 27:

		METHANE (G20)			BUTANE (G30)			PROPANE (G31)		
HEAT OUTPUT	HEAT OUTPUT	GAS FLOW-RATE BURNER	NOZZLE PRESSURE BURNER		GAS FLOW-RATE BURNER	NOZZLE PRESSURE BURNER		GAS FLOW-RATE BURNER	NOZZLE PRESSURE BURNER	
(kW)	(kcal/h)	(m^3/h)	(mbar)	(mm H_2O)	(kg/h)	(mbar)	(mm H_2O)	(kg/h)	(mbar)	(mm H_2O)
32.0	27520	3.45	5.05	51.5	2.57	4.81	49.1	2.53	6.61	67.4
31.0	26660	3.34	4.74	48.4	2.49	4.50	45.9	2.45	6.18	63.1
29.0	24940	3.12	4.15	42.4	2.33	3.91	39.9	2.29	5.38	54.9
27.0	23220	2.91	3.61	36.8	2.17	3.37	34.3	2.13	4.63	47.3
25.0	21500	2.69	3.10	31.6	2.01	2.86	29.2	1.98	3.94	40.2
23.0	19780	2.48	2.63	26.8	1.85	2.41	24.5	1.82	3.32	33.8
21.0	18060	2.26	2.20	22.5	1.69	1.99	20.3	1.66	2.75	28.0
19.2	12165	2.06	1.84	18.8	1.54	1.65	16.9	1.52	2.28	23.2
17.0	14620	1.84	1.47	15.0	1.37	1.31	13.3	1.35	1.79	18.3
15.0	12900	1.62	1.16	11.8	1.21	1.03	10.5	1.19	1.40	14.3
13.0	11180	1.41	0.89	9.1	1.05	0.79	8.1	1.03	1.07	10.9
11.0	9460	1.20	0.66	6.8	0.89	0.60	6.1	0.88	0.80	8.1
9.0	7740	0.98	0.47	4.8	0.73	0.45	4.6	0.72	0.58	5.9
6.3	5418	0.69	0.27	2.8	0.52	0.32	3.3	0.51	0.38	3.8

Victrix Zeus 20/27 Wiring Diagram: